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SBIR and STTR at the Department of Energy

The Assessment of the SBIR and STTR Programs
Washington DC
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Dr. Charles E. Kolb
Aerodyne Research, Inc.
NASEM Committee on
Capitalizing on Science, Technology, and Innovation: An Assessment of the Small Business Innovation Research Program - Phase II

Program Objectives

- Evaluation made against the congressional objectives for the SBIR program.
- The statutory purpose of the SBIR Program is to:
  1. Stimulate technological innovation;
  2. Use small business to meet Federal Research/Research and Development needs;
  3. Foster and encourage participation by socially and economically disadvantaged small businesses (SDBs), and by women-owned small businesses (WOSBs), in technological innovation; and
  4. Increase private sector commercialization of innovations derived from Federal Research/Research and Development, thereby increasing competition, productivity and economic growth.

Methodology

- The committee's findings are based on a complement of quantitative and qualitative tools including
  - a survey, case studies of award recipients, agency data, public workshops, and agency meetings.
- Inherent challenges in tracking outcomes

Data Challenges

- Limitations of assessments reflect data challenges
  - Ability to survey SBIR awardees is limited.
  - Ability to follow SBIR companies through time is limited.
  - Ability to compare performance of SBIR winners to near winners is limited.
  - Limited data means that we were not able to test for the significance of the results.

Survey Population and Response Rate

- **Total Population** for 2014 Survey was sent to every PI who won a DOE Phase II SBIR award from FY2001 to FY2010.
  - Each asked to complete a max of 2 questionnaires.
- Response rates reported on two bases:
  - **Preliminary Population** (1,077 awards): Total Population minus randomly selected awards made to PIs who received more than two awards and those awards with significant missing data.
  - **Effective Population** (494 awards): Preliminary Population minus awards for which PIs were not contactable.
- 269 responses received:
  - 25% of the Preliminary Population of Awards
  - 54.55% of the Effective Population of Awards

Findings

The SBIR program at DOE is having an overall positive impact.

The STTR program at DOE is also meeting its statutory objectives

Overall Results

- The SBIR program at DOE is:
  - Enabling the expansion of technical knowledge.
  - Increasingly aligned with DOE Missions.
  - Generating significant commercial outcomes.
- However, the committee finds that more needs to be done to "foster and encourage participation by socially and economically disadvantaged small businesses and by women owned businesses in technological innovation."

Significant Commercialization

- Small technology companies use SBIR/STTR awards to advance projects, develop firm-specific capabilities, and ultimately create and market new commercial products and services.
  - DOD: over time about 70 % of Phase II projects at DoD reach the market.
  - NIH: 49% Phase II respondents report sales, and an further 25 percent expect future sales
  - NSF: ~70 % report sales, and an additional 19 % anticipate future sales.
  - NASA: 46% Phase II respondents report sales, and an further 26 percent expect future sales
  - DOE: 49% of Phase II respondents report sales, and a further 23 % anticipate further sales
- Commercialization outcomes are skewed, with a small number of awards accounting for a very large share of overall sales generated by the program.

SBIR projects attract significant additional funding

- Drawing-in investments reported by Phase II survey respondents
  - DOD: ~60 % reported additional investment funding
  - NIH: ~80 % reported additional investment funding
  - NSF: 63 % reported additional investment funding
    NASA: 65 % reported additional investment funding
  - DOE: 78% reported additional investment funding
- SBIR award provides a certification of technological promise and possible commercial viability.

Firm Creation and Project Initiation

- The DOE SBIR/STTR programs encourage new firm start-ups.
  - 45% of companies surveyed reported that their firm was founded entirely or in part because of SBIR/STTR
- DOE SBIR/STTR funding makes a substantial difference
  - 71% of survey respondents reported that their project probably or definitely would not have proceeded without SBIR/STTR funding
  - 61% of respondents indicated that DOE SBIR/STTR programs had a highly positive or transformative effect on their company

SBIR and the University Connection

- SBIR is increasing connections between companies and universities
- Phase II survey respondents reporting a link to a university for the surveyed project:
  - 33 % at DoD,
  - 60 % at NSF;
  - 63% at NIH
  - 30 % at NASA
  - 43 % at DOE
- Participation by faculty and graduate students; and use of universities and research institutions as subcontractors.

Minority and Women Participation in SBIR

- Share of awards to woman-owned Small Businesses (WOSBs) at DOD, NIH, NSF, NASA, and DOE
  - 15 %of Phase I awards were to Woman-Owned Small Businesses (WOSB) at DoD, 13 percent at NSF and 10% at NIH, 8% at NASA
  - … and 9 % at DOE
- Share of awards to Minority-Owned Small Businesses:
  - For DoD, 7% of SBIR Phase I awards go to MOSB
  - For NSF, approximately 10 percent of SBIR Phase I awards go to MOSB.
  - For NIH, the share of Phase I SBIR and STTR awards has declined from a peak of 3.5 percent in 2006 to less than 2 percent in 2014.
  - For NASA, 8% of SBIR Phase I awards go to MOSB
  - For DOE, minority owned firms accounted for less than 7% of Phase I SBIR and STTR awards
- DOE is making attempts to understand patterns of women and minority participation, but more is needed

Black- and Hispanic-owned small businesses are a very small share

- At DOD, Black-owned small businesses accounted for approximately 0.5 percent of all survey respondents; Hispanic-owned firms, about 1 %.
- For NSF, Black-owned small businesses accounted for approximately 1 % of all respondents; Hispanic-owned firms, about 3 %.
- For NIH, Black-owned small businesses accounted for only 0.7 % of all respondents; Hispanic-owned small businesses, about 1.7 %
- At NASA, 2% and 3% respectively.
- For DOE, firms owned by Blacks, Hispanics and Native Americans together accounted for 2% of all responses.

STTR at DOE

- In general, DOE's STTR program is meeting the program's objectives
- We find that National Laboratories generally do not make good formal partners for small business concerns:
  - Their administrators do not prioritize SBIR/STTR because the funding amounts are small;
  - Small businesses have limited leverage if the Laboratories fail to meet their obligations.
- The DoE SBIR and STTR programs have not made sufficient efforts to enhance collaborations between the National Laboratories and small innovative firms.

Recommendations

- We emphasize the recommendations made in the first round of assessments on the need for program stability and flexibility
  - Preserve Program Stability: Long reauthorizations are essential for program success
  - Preserve Program Flexibility: Multiple Management Models
- Need for Regular Internal and External Evaluations
  - Improve collection of data and track outcomes
  - Improve analysis and use of metrics
  - Annual reports to Congress should replace existing reporting requirements

Improve Monitoring, Evaluation, and Assessment

- Improve current data collection approaches and methodologies.
  - Data collection should address the entire range of congressionally mandated outcomes, not just commercialization
  - It should be extended to other aspects of the program, including demographic data for applicants and awardees
- Ensure that the outcomes data are systematically employed to guide program management.

Foster Participation by Minorities & Women

- Agencies should substantially enhance efforts to address the clear Congressional mandate to foster the participation of under-represented populations
  - Agencies should not develop quotas
  - Agencies should develop better benchmarks and metrics
  - Agencies should develop targeted outreach and education programs
  - Provide Management Resources and designate Staff
- Related Recommendation from the STTR Report: SBA should change its definitions to address congressional intent with regard to minorities.
  - Including Asian Americans has the direct effect of underplaying the low participation for African American, Hispanic American, and Native American entrepreneurs and principal investigators.

Address Underserved Populations

- DoE should review internal award and selection data to address questions arising from disparities between Phase I and Phase II success rates for woman- and minority-owned firms and firms not in those categories.
- DoE should monitor selection processes and ensure that patterns of applications, awards, and success rates are reported out annually.
- DoE should ensure that reviewers include appropriate numbers of women and minorities. One additional reason to increase the number of reviewers is to expand this pool.

Link the National Labs

- Develop programs linking Laboratories' procurement actions with relevant SBIR/STTR projects.
- Ensure that Laboratories fully understand and respect the intellectual property (IP) provisions of SBIR/STTR.
- Examine from a strategic perspective how the relationship of SBIR/STTR with the National Laboratories works today.

Improve Program Management

- Improve the topic development process.
  - Ensure that all published topics are funded.
  - Ensure adequate turnover in subtopics
- Improve the application review system and monitor the profile of applicants.
- Change the balance of funding to better reflect innovation and commercialization opportunities in the private sector
  - Allocate funding based on the needs of the agency, not the short term goals of individual divisions or programs
- Further address the funding gap between Phase I and II awards.

Thank You

Dr. Charles E. Kolb

Aerodyne Research, Inc.

NASEM Committee on Capitalizing on Science, Technology, and Innovation: An Assessment of the Small Business Innovation Research Program - Phase II

We look forward to the remarks from the Department of Energy

It is my pleasure to welcome

Dr. Manuel Oliver

Director, SBIR/STTR Programs Office

U.S. Department of Energy